The Reach and Impact of Radio Communication Campaigns on Reproductive Health in Malawi

Dominique Meekers[1]
Ronan Van Rossem[2]
Martha Silva[1]
Andrew Koleros[1]

[1] Department of International Health and Development, School of Public Health and Tropical Medicine, Tulane University, 1440 Canal Street, Suite 2200, New Orleans, LA 70112

[2] Department of Sociology, Ghent University, Universiteitstraat 4, 9000 Gent, Belgium

Table of Contents

Acknowledgements

This study was funded by the United States Agency for International Development (USAID), through a grant from the MEASURE Evaluation project (Task Order #3933). The authors are grateful to Afia Appiah for assistance with literature searches and reviews, to Sohail Agha and Ruth Bessinger for comments and suggestions, and to Susan Bergman for editing.

Abstract

Objectives: Several reproductive and HIV/AIDS prevention programs are being implemented to address reproductive health problems and the HIV/AIDS epidemic in Malawi. This paper assesses the reach of selected radio programs about family planning and health, and their impact on discussion of family planning and condom use.

Data and Methods: Our analysis is based on data from the 2000 Malawi Demographic and Health Survey, which contains information on a representative sample of women aged 15-49 and men aged 15-54. To control for self-selection and endogeneity, we estimate the effect of program exposure on the behavioral outcomes using a two-stage regression model.

Results: Exposure to radio programs about family planning and health was very high, particularly for males. Results for both men and women show that those who were exposed to radio programs about family planning and HIV/AIDS were more likely to have discussed family planning with their partner (OR=1.14 for men and 1.13 for women) and to have ever used a condom (OR=1.12 and 1.04, respectively). Exposure to radio programs also increased the relative odds that males ever tried condoms (OR=1.062), but no significant effect was observed for females. Program exposure had no significant effect on condom use in last intercourse for either sex.

Conclusions: Radio programs in Malawi have high reach and have a significant impact on family planning discussion. However, their impact on condom use has been very limited. While it is possible that it is too early for these programs to show impact on condom use, this is somewhat unlikely, considering that program reach is so high and that some of the programs have been on the air for several years. To ensure that future radio programs increase their effectiveness in increasing condom use for HIV prevention and family planning, it is recommended that qualitative research be used to inform the design of the key campaign messages.

The Reach and Impact of Radio Communication Campaigns on Reproductive Health in Malawi

Introduction

As in many Sub-Saharan countries, Malawian people face serious health challenges. Malawi has been slow to adopt contraceptive use and unprotected intercourse is common among married and unmarried people (Lema, Mpanga, & Makanani, 2002; National Statistical Office (Malawi) & Macro International, 2001). In addition, the HIV/AIDS prevalence continues to increase among the younger generations. These problems have led many governmental and non-governmental organizations to implement communications programs encouraging people to engage in safe sexual behavior (Kambwiri, 2003; Population Services International (PSI), 2003; Reijer & Chalimba, 2000). Responding to the growing magnitude and importance of these communications programs, the 2000 Malawi Demographic and Health Survey has included a set of questions measuring the reach of selected reproductive health programs. The purpose of this paper is to assess the reach of selected radio health communication activities in Malawi, and to assess their impact on the discussion of family planning and condom use.

Background

REPRODUCTIVE HEALTH

Despite the significant rise in modern contraceptive prevalence from 6.3% to 21.5% between 1992 and 2000, the total fertility rate remains above 6 children per woman (Cohen B, 2000; National Statistical Office (Malawi) & Macro International, 2001; van den Broek NR,

White SA, Ntonya C, Ngwale M, & Cullinan TR, 2003). The unmet need for contraceptives is high, and a high proportion of the population worries about HIV/AIDS (Schatz, 2003).

Malawi's youth faces particular challenges in protecting and promoting their health, in part due to the breakdown of traditional forms of sex education. The average age at first intercourse is early, and many youth initiate their sexual life without receiving information about sexuality (Helitzer-Allen & Makhambera, 1993; National Statistical Office (Malawi) & Macro International, 2001). Additional reproductive health challenges faced by adolescents are early marriage, unsafe sex, unwanted pregnancy and unsafe abortions (Lema et al., 2002).

Sexually transmitted infections (STI) are also common (Banerjee A et al., 2000; Komolafe, Nkumba, Makoka, Makhalira, & Bonongwe, 2000; Wynendaele, Bomba, M'Manga, Bhart, & Fransen, 1995; Zachariah R et al., 2002; Zachariah et al., 2003). The national syphilis seroprevalence has been estimated at between 1 and 8%, and some studies suggest that as many as 40% of attendees of urban antenatal clinics are diagnosed with one or more STIs (Dallabetta, Miotti, & Chiphangwi, 1993; Daly CC, Franco L, Chilongozi DA, & Dallabetta G, 1998).

HIV/AIDS

Similar to other Sub-Saharan African countries, Malawi's rate of HIV infection has increased dramatically in the last two decades. The nationwide prevalence is currently estimated at 15-17% (Bracher, Santow, & Watkins, 2003; Crampin et al., 2003; Gisselquist D, 2003; Kachapila, 1998; Kemp, Aitken, LeGrand, & Mwale, 2003; Kumwenda, Taha, & Celentano, 2003). In urban areas, the HIV prevalence rate is estimated to be as high as 30% (Crampin et al., 2003; Sliep, Poggenpoel, & Gmeiner, 2001; Taha TE et al., 1998). It is estimated that 850,000 Malawians are currently living with HIV. Although the overall incidence of the disease has decreased since 1993 and there are some signs of a decline in HIV prevalence, it is unclear whether the latter is random fluctuation or a real trend (Kaluwa, 1997; Kemp et al., 2003). HIV

prevalence is highest among youth, making them one of the prime targets for prevention interventions. Condom use is generally low (Lule, Moses, & Bandawe, 1997; National Statistical Office (Malawi) & Macro International, 2001). Although some studies show a demand for voluntary counseling and testing (Zachariah, Spielmann, Harries, Buhendwa, & Chingi, 2003), HIV counseling and care is mostly a foreign concept, especially in rural areas (Sliep et al., 2001). Stigma and fear of rejection keep people from accessing those services that are available. For these reasons, many organizations have focused their efforts on promoting behavioral and attitudinal change towards safer sexual practices through mass media and communications initiatives.

REPRODUCTIVE HEALTH COMMUNICATION PROGRAMS

The Malawi Broadcasting Corporation (MBC) has been broadcasting several radio programs on health and women's issues, including *Tikanena*, *Pamtondo*, and *Umoyo ndi Chitukuho M'Malawi* (One World, 2003). *Tinkanena*, sponsored by JSI and aired in 1997, was a radio soap opera that created an understanding of the situation youth face in Malawi with regards to family planning and HIV (Reijer & Chalimba, 2000). *Chitukuku M'Malawi* addressed diverse health issues and was put forth by the Ministry of Community Development. The Ministry of Health developed several mass communication initiatives also broadcast by MBC Radio, such as *Radio Doctor* and *Umoyo M'Malawi*, which discusses diarrheal prevention strategies and health promotion (Kambwiri, 2003). There is some evidence suggests that women who learned about family planning from the Radio Doctor program are more likely than others to use modern contraceptives (Lawrence, s.d.). A program called *Kulera*, sponsored by Marie Stopes International's local partner organization called Banja La Mtsogolo, (meaning "Ideal Family of the Future") also delivered messages of family planning and prevention. Earlier research has shown that mass media exposure to family planning messages and seeing adverts for condoms has a significant positive effect on use of modern contraceptives (Cohen B, 2000).

Data and Methods

DATA

This study uses data from the 2000 Malawi Demographic and Health Survey (MDHS), containing information from a representative sample of 13,220 women aged 15-49 and 3,092 men aged 15-54 (National Statistical Office (Malawi) & Macro International, 2001). Our analysis is restricted to those who were sexually active in the past year (10,465 females and 2,486 males). The MDHS surveys contain information on a wide range of topics, including mass media exposure, fertility, family planning, and HIV/AIDS related knowledge and behavior.

In addition to the standard question modules, the survey included questions on exposure to several health communication campaigns programs. Specifically, respondents were asked if they had heard in the last few months any of twelve different radio series about family planning and health (*Uchembere Wabwino, Phukusi la Moyo, Pa Mtondo, Women's Talking Point, Window Through Health, Umoyo M'Malawi, Tinkanena, Radio Doctor, Chitukuku M'Malawi, Women's Forum, Tichitenji,* and *Kulera).*

Both the female and male surveys were conducted using a three-stage sample design. In the first stage, 560 census enumeration areas were selected from the 1998 Population Census. Secondly, a representative sample of households was selected from those clusters. All women aged 15-49 in the selected households were eligible for interviewing. A sub-sample of one-in four households was selected in which men 15-54 years of age were also interviewed.

MEASURES

The outcome measures for our analyses, which capture the respondents' reproductive health behaviors, are dichotomous variables indicating whether the respondent discussed family

planning matters with his/her partner in the last few months, had ever used a condom, and had used a condom during the last sexual encounter.

To measure exposure to communication programs about family planning and health, we use a count of the number of radio programs that the respondent heard in the last few months, ranging from 0 to 12 (including *Uchembere Wabwino, Phukusi la Moyo, Pa Mtondo, Women's Talking Point, Window Through Health, Umoyo M'Malawi, Tinkanena, Radio Doctor, Chitukuku M'Malawi, Women's Forum, Tichitenji,* and *Kulera).*

As control variables, we included the respondents' age (in years), type of place of residence (urban vs. rural), religion (Protestant, Catholic, Muslim, or other), highest level of education achieved (none, primary, secondary or higher), number of household assets[1]), number of sexual partners in the past 12 months, and a dichotomous variable indicating whether respondents believe that people can protects themselves from the AIDS virus by using a condom every time they have sex (yes vs. no/not sure).

Media exposure was captured by dichotomous variables measuring whether the respondent read newspapers or magazines, listened to the radio, and watched TV.

We also included dummy variables indicating whether the respondent desires a child within the next two years, knows of a place where to obtain condoms, visited a health center in the past twelve months, thinks she or he could obtain a condom, if s/he wanted to (yes vs. no/not sure).

[1] Assets included in this variable were: radio, TV, bicycle, motorcycle, car/truck, piped water, flush toilet, and a finished floor. The number of assets available in the household was recoded in four categories: Low (0 items), Medium (1 asset), Medium-High (2 assets) and High (3 or more assets).

STATISTICAL METHODS

For categorical variables, we use χ^2-tests to compare the distributions for the female and male samples. For parametric variables, we compare these sub-samples using independent sample *t*-tests.

When examining the effect of program exposure on reproductive health behaviors, it is possible that unobserved exogenous factors may affect both reproductive health behavior and program exposure, and that persons who display certain reproductive health behaviors may seek out programs about reproductive health. For instance, people who intend to use condoms to avoid HIV infection may actively seek out sources of information about condom use and where to obtain them. In such case, this intention could influence both condom use and exposure to information about condoms. Standard single stage regression techniques always assume that all predictor variables are exogenous to the model. However, when program exposure is endogenous the error terms of program exposure and reproductive health behavior variables are correlated. This may bias the estimate for the effect of program exposure on reproductive health behavior. Researchers can avoid this pitfall by using two-stage regression models in those instances when program exposure shows substantial endogeneity (Bollen, Guilkey, & Mroz, 1995; Chen & Guilkey, 2003).

The proposed two-stage model first requires estimating program exposure using a set of exogenous variables. For our indicator of exposure to family planning and health radio programs, which is a count variable, we used Poisson regression for the first step (Bollen et al., 1995). In the second step, the estimated values for exposure to the radio programs are used in the model for reproductive health behaviors rather than the observed exposure variables. As our reproductive health behavior outcome measures are dichotomous, logistic regression is used for this second step. Where no substantial endogeneity in program exposure was observed, the results from the standard one-stage model are used.

The models used to estimate program exposure and reproductive health should not contain the same set of exogenous variables. To estimate program exposure, we included in following variables in the model: age, residence, education, number of partners, belief that consistent condom use reduces the risk of AIDS infection, and the media exposure indicators (reads newspaper, watches TV, listens to the radio). For females, we also in include the index of household assets, and a dichotomous variable indicating whether they visited a health center in the past year. In the model for reproductive health behaviors, the media exposure variables were excluded from the model, and the religion variable included. Program exposure was included as the number of radio programs on family planning and health that the respondent recalls. All results are presented in the form of odds ratios.

SAMPLE DESCRIPTION

Table 1 shows the sample characteristics. The female and male samples are significantly different on most socio-demographic characteristics, although many of the differences are small. On average, the male sample was 2.5 years older than the female one due to the different eligibility criteria for the two samples. Over two thirds of respondents lived in rural areas. Women are more likely than men to have had no formal education (28% vs. 11%) and less likely than men to have had secondary or higher education (11% vs. 22%). Media exposure was significantly higher among men than among women. Sixty percent of men and 30% of women report reading the newspaper; 93% of men and 79% of women listen to the radio; and 36% of men and 11% of women watch TV. Table 1 also shows that 93% of men and 76% of women reported hearing reproductive health messages on the radio. On average, men reported hearing 8.3 radio programs, compared to 6.1 for women.

Table 1 about here

Men are more likely than females to report having multiple partners. While only 1% of women reported more than one sex partner in the past year, 18% of men did. Men are slightly more likely than women to believe that always using a condom reduces the risk of HIV/AIDS infection (73% vs. 65%).

Although less than 20% of respondents report wanting a child in the next two years, few respondents discussed family planning with their partner in the last few months before the survey (11% of women and 19% of men). Knowledge of a condom source is good, with 79% of women and 89% of men reporting to know a course. Most respondents (60% of women and 82% of men) also report that they could obtain a condom if they wanted to. Nevertheless, condom use is very low, especially among women. Although 10% of women and 43% of men reported ever using condoms, only 5% of women and 15% of men reported using one in their last sex act.

Results

LEVEL OF PROGRAM EXPOSURE

Figure 1 shows the percentage of male and female respondents who report hearing any of the twelve radio programs about family planning and health in the last few months before the survey. The radio programs with the highest recall are *Tinkanena*, which was cited by 67% of females and 89% of males, and *Kulera*, which was cited by 68% of females and 85% of males. Over 55% of females and over 75% of males recall hearing each of the following programs: *Chitukuku M'Malawi*, *Umoyo M'Malawi*, *Phukusi lo Moyo*, *Uchembere Wabwino* and *Pa Mtondo*. The programs *Radio Doctor* and *Tichitenji* have somewhat lower, but still fairly high, recall. The radio programs *Women's Form*, *Women's Talking Point*, and *Window Through Health* have the lowest recall. English language programs, therefore, seem to have lower recall than local language ones.

Figure 1 about here

Table 2 shows the results of regression analyses predicting the number of radio programs about family planning and health that the respondent was exposed to. These analyses identify the predictors of program exposure. They also generate the residual variables that are used to test for endogeneity. In the case of significant endogeneity, these models are also used to generate the instrumental variable that is used in the two-stage regression model. It needs to be noted that although for women the model predicted program exposure relatively well, for men the model performed quite poorly, as indicated by pseudo-R^2 of 17% and 4%, respectively.

Table 2 about here

The results presented in Table 2, columns 2 and 3, indicate that most socio-demographic variables included in the model have a positive effect on the odds that a respondent was exposed to the radio programs. For example, age, secondary education, and assets all have a positive effect on the number of radio programs about family planning and health the respondents was exposed to. Rural residence has a positive effect for women, but no effect for men. Perceived condom efficacy for HIV prevention has a positive effect for both genders, as does newspaper reading and radio listening. The effect of radio listening, in particular, was quite large. However, TV watching has a positive effect for men, but no effect for women.

EFFECT OF CAMPAIGN EXPOSURE ON REPRODUCTIVE HEALTH BEHAVIOR

Any observed associations between program exposure and reproductive health behaviors could be affect by the endogeneity of program exposure (Bollen et al., 1995; Chen & Guilkey, 2003). Therefore, we first test for endogeneity (results not shown). The findings from these tests indicate that endogeneity is not a problem, and that a one-stage model can be used. Nevertheless, we estimated both one-stage and two-stage regression models for all variables.

EFFECT ON DISCUSSION OF FAMILY PLANNING

The effect of the number of radio programs about family planning and health that the respondent was exposed to on the odds that sexually active respondents discussed family planning with their partner in the past few months is shown in Table 3. Since no endogeneity was present, we focus on the results of the one-stage model (Models 1 and 3). The predictive power of the models was limited, however.

Model 1 in Table 3 shows that the likelihood that women have discussed family planning with their partner increases with the number of radio programs about family planning and health they have been exposed to. Exposure to a radio program about family planning and health

increases the odds that women have discussed family planning by 5% each (OR=1.052). Model 1 further shows that rural women are more likely to discuss family planning with their partner than urban women. The number of household assets also has a positive effect on discussion of family planning (OR=1.072). As anticipated, women who wanted a child in the near future are less likely than other women to have discussed family planning (OR=.613). Knowledge of a condom source and self-efficacy to obtain condoms both have strong positive effects on discussion of family planning among women (OR=1.489 and 1.434, respectively). Finally, women who have visited a health center have substantially higher odds of having discussed family planning with their partner than women who did not visit a health center (OR=1.879).

Table 3 about here

The results for males, shown in Model 3, show that exposure to a larger number of radio programs about family planning and health increases the odds that males have discussed family planning with their partner (OR=1.059). The respondents' age also has a positive effect (OR=1.028), while being Muslim reduces the odds of discussion of family planning (OR=.683). Males who are confident that they can obtain a condom if they wanted to are more likely than other males to have discussed family planning with their partner (OR=2.403).

EFFECT ON EVER USE OF CONDOMS

Table 4 shows the effect of the number of radio programs on the likelihood that the respondents was exposed to on the likelihood of ever having used condoms. Since there was no significant endogeneity, we discuss the results from the one-stage regression model. The results for females show that the number of radio programs about family planning and health the respondent was exposed to did not significantly affect the likelihood that women have ever used condoms. The relative odds of ever use of condoms decrease significantly with age (OR=.863). The relative odds of ever having used condoms are also significantly lower for Islamic women

(OR=.769) and for rural women (OR=.789). On the other hand, the relative odds of ever having used condoms increase with the number of household assets (OR=1.061), and are significantly higher for women with primary education (OR=1.718) or with secondary education (OR=2.986). The respondent's number of sexual partners in the past year, the perceived effectiveness of condoms, knowledge of a condom source, and condom use self-efficacy all increase the relative odds that a woman have ever used condoms (OR=3.237, 1.235, 2.713, and 1.855, respectively).

Table 4 about here

Unlike the case for women, the results for males indicate exposure to a larger number of radio programs about family planning and health is associated with a higher likelihood of males having ever tried condoms (OR=1.062). The relative odds of ever having used condoms again decrease with age (OR=.961), and are also significantly lower for males who adhere to "other" religions (OR=.384). By contrast, the relative odds of ever having used condoms are significantly higher for males with secondary or higher education (OR=2.651), those with a higher number of sexual partners in the past year (OR=1.656), and for males who believe they could obtain a condom if they wanted to (OR=3.399).

EFFECT ON CONDOM USE IN LAST INTERCOURSE

The effect of exposure to radio programs about family planning and health on the odds that respondents used a condom in last intercourse is shown in Table 5. As before, we focus on the results of the one-stage model because no endogeneity was present.

The results presented in Table 5 indicate that the number of radio programs on family planning and health the respondents were exposed to did not have any significant effect on condom use in last intercourse for either sex. Among women, the relative odds of having used a condom in last intercourse decrease with age (OR=.907). The relative odds of having used a condom in last intercourse are also significantly lower for women who want to have a child in

the next two years (OR=.541), and for women who have visited a health center (OR=.715). By contrast, the relative odds that women used a condom in last intercourse are significantly higher for those women who had a higher number of sexual partners in the past year (OR=2.824), who know a condom source (OR=2.044), and who believe that could obtain a condom if they wanted to (OR=2.068).

Table 5 about here

The results for males, shown in column 3, also show that exposure to the radio programs had no significant effect on condom use in last sex. The relative odds that males used a condom in last intercourse decrease significantly with age (OR=.913), and are significantly lower for those males who want to have a child in the next two years (OR=.241). The relative odds of having used a condom in last intercourse are significantly higher for males with secondary or higher education (OR=2.173) and those who feel confident they could obtain a condom if they wanted to (OR=3.675).

Conclusion

Malawi is currently dealing with important health issues, including high levels of unwanted pregnancies, especially among youth, and a very severe HIV/AIDS epidemic. In response, governmental and non-governmental organizations have implemented health communication programs to educate the population about these problems and to promote healthier behavior. Radio programs about family planning, HIV prevention and health are an important component of those efforts. The purpose of this study has been to assess the reach and impact of a selected group of twelve health-oriented radio programs.

Exposure to most of the radio programs considered was very high. This was the case for both males and females, although recall was consistently higher for males. The radio programs with the highest levels of exposure, including *Tinkanena* and *Kulera*, were cited by over 85% of males and over 65% of females. Even the programs with the lowest levels of exposure, were still mentioned by roughly one third of the sample.

The analyses of the impact of exposure to the radio programs about family planning and health shows that exposure to a larger number of such programs is associated with a significantly higher likelihood of having recently discussed family planning with one's partner, for both men and women (OR= 1.052 and 1.059, respectively). Exposure to a larger number of these health-oriented radio programs was also associated with a significantly higher likelihood that males had ever tried condoms (OR=1.062), but for females radio exposure had no effect on ever use of condoms. However, exposure to radio programs had no significant impact on condom use in last intercourse for either sex.

In sum, the evidence shows that radio programs about family planning and health succeeded in reaching the majority of the population. In fact, it is evident that a very large fraction of the population has been exposed to several of these radio programs. The evidence

further shows that exposure to these programs has increased discussion of family planning between partners, even after controlling for other factors. This increased level of discussion of family planning may eventually translate in to higher levels of family planning and higher levels of condom use for HIV/AIDS prevention. However, as yet these programs appear to have had only a very modest effect on ever use of condoms among males, and no effect among females. While it is possible that more time is needed for these programs to show impact on condom use, this appears unlikely. Not only is the reach of most programs very high, some programs have been on their air for several years. Hence, it appears that these programs have not been addressing the key constraints to condom use in Malawi. To ensure that future radio programs increase their effectiveness in increasing condom use for HIV prevention and family planning, it is recommended that qualitative research be used to inform the design of the key campaign messages.

References

Banerjee A, Harries AD, Mphasa N, Yadid AE, Nyirenda T , & Salaniponi FM. (2000). Prevalence of HIV, sexually transmitted disease and tuberculosis amongst new prisoners in a district prison, Malawi. Tropical Doctor , 30(1), 49-50.

Bollen, K. A., Guilkey, D. K., & Mroz, T. A. (1995). Binary outcomes and endogenous explanatory variables: Tests and solutions with an application to the demand for contraceptive use in Tunesia. Demography, 32(1), 111-131.

Bracher, M., Santow, G., & Watkins, S. C. (2003). Moving and marrying: modelling HIV infection among newly-weds in Malawi. Demographic Research, 19 (1 Suppl), S1-S7.

Chen, S., & Guilkey, D. K. (2003). Determinants of Contraceptive Method Choice in Rural Tanzania Between 1991 and 1999. Chapel Hill, NC: MEASURE *Evaluation*.

Cohen B. (2000). Family planning programs, socioeconomic characteristics, and contraceptive use in Malawi. World Development, 28 (5), 843-60.

Crampin, A. C., Glynn, J. R., Ngwira, B. M., Mwaungulu, F. D., Ponnighaus, J. M., Warndorff, D. K., & Fine, P. E. (2003). Trends and measurement of HIV prevalence in northern Malawi. Karonga Prevention Study, Chilumba, Malawi. AIDS, 15(17), 1817-25.

Dallabetta, G. A., Miotti, P. G., & Chiphangwi, J. D. et. al. (1993). High socioeconomic status as a risk factor for human immunodeficiency virus type 1 (HIV-1) infection but not for sexually transmitted diseases in women in Malawi: implications for HIV-1 control. Journal of Infectuous Diseases, 167, 36-42.

Daly CC, Franco L, Chilongozi DA, & Dallabetta G. (1998). A cost comparison of approaches to sexually transmitted disease treatment in Malawi. Health Policy Plan, ;13(1), 87-93.

Gisselquist D. (2003). Unexplained high HIV-1 incidence in a cohort of Malawi men. Sexual Transmitted Diseases, 30(2), 183-4.

Helitzer-Allen, D., & Makhambera, M. (1993). How can we help adolescent girls avoid HIV infection? Network, 13(4), 7.

Kachapila, L. (1998). The HIV/AIDS epidemic in Malawi. International Nursing Review, 45(6), 179-81.

Kaluwa, O. L. (1997). HIV/AIDS in Malawi: whose responsibility? AIDS Analysis Africa , 7(6), 4-5.

Kambwiri, J. M. R. (2003). Personal communication (11/19/2003).

Kemp, J., Aitken, J. M., LeGrand, S., & Mwale, B. (2003). Equity in health sector responses to HIV/AIDS in MalawiRegional Network for Equite in Health in Southern Africa (EQUINET), in cooperation with Oxfam GB.

Komolafe, O. O., Nkumba, J., Makoka, M., Makhalira, A., & Bonongwe, P. (2000). Sexually transmitted diseases at Queen Elizabeth Central Hospital, Blantyre, Malawi. East African Medical Journal, 77(12), 644-647.

Kumwenda, N., Taha, T. E., & Celentano, D. (2003). Response to letter, "Unexplained high HIV-1 incidence in a cohort of Malawi men". Sexually Transmitted Diseases, 30(2), 185.

Lawrence, R. (s.d.) Who is using modern methods of contraception in Malawi? Evidence from the Malawi Demographic and Health Survey 2000 [Web Page]. [2003, November 20].

Lema, V. M., Mpanga, V., & Makanani, B. S. (2002). Socio-demographic characteristics of adolescent post-abortion patients in Blantyre, Malawi. East African Medical Journal, 79(6), 306-10.

Lule, G. S., Moses, A., & Bandawe, C. (1997). Characteristics and sexual behaviour of individuals attending the sexually transmitted diseases clinic at Queen Elizabeth Central Hospital Blantyre, Malawi. Central African Journal of Medicine, 43(1), 6-11.

National Statistical Office (Malawi), & Macro International, I. (2001). Malawi Demographic and Health Survey 2000. Calverton, MD: National Statistical Office (Malawi)//Macro International, Inc.

One World. (2003) Malawi Broadcasting Corporation [Web Page]. [2003, November 20].

Population Services International (PSI). (2003) Malawi Social Marketing Program [Web Page]. [2003, November 20].

Reijer, P., & Chalimba, M. (2000). Going to Scale: Sustained Risk Reduction Behavior for Youth, an Evaluation Report. UNICEF/Malawi and Government of the Netherlands.

Schatz, E. (2003). Comparing, contextualizing, and conceptualizing: Enhancing quantitative data on women's situation in rural Africa. Demographic Research, 1(Special Collection), 143-174.

Sliep, Y., Poggenpoel, M., & Gmeiner, A. (2001). The experience of HIV reactive patients in rural Malawi--Part I. Curationis, 24(3), 56-65.

Taha TE, Dallabetta GA, Hoover DR, Chiphangwi JD, Mtimavalye LA, Liomba GN, Kumwenda NI, & Miotti PG. (1998). Trends of HIV-1 and sexually transmitted diseases among pregnant and postpartum women in urban Malawi. AIDS, 12(2), 197-203.

van den Broek NR, White SA, Ntonya C, Ngwale M, & Cullinan TR. (2003). Reproductive health in rural Malawi: a population-based survey. British Journal of Obstetrics and Gynaecology, 110(10), 902-908.

Wynendaele, B., Bomba, W., M'Manga, W., Bhart, S., & Fransen, L. (1995). Impact of counselling on safer sex and STD occurrence among STD patients in Malawi. International Journal of STD & AIDS, 6, 105-109.

Zachariah R, Nkhoma W, Harries AD, Arendt V, Chantulo A , Spielmann MP, Mbereko MP, & Buhendwa L. (2002). Health seeking and sexual behaviour in patients with sexually transmitted infections: the importance of traditional healers in Thyolo, Malawi. Sex Transm Infect. 78(2), 127-9.

Zachariah, R., Spielmann, M. P., Harries, A. D., Buhendwa, L., & Chingi, C. (2003). Motives, sexual behaviour, and risk factors associated with HIV in individuals seeking voluntary counselling and testing in a rural district of Malawi. Tropical Doctor, 33(2), 88-91.

Zachariah, R., Spielmann, M. P., Harries, A. D., Nkhoma, W., Chantulo, A., & Arendt, V. (2003). Sexually transmitted infections and sexual behavior among commercial sex workers in a rural district of Malawi. International Journal of STD & AIDS, 14, 185-188.

Figure 1: Exposure to radio programs about family planning and health, by gender

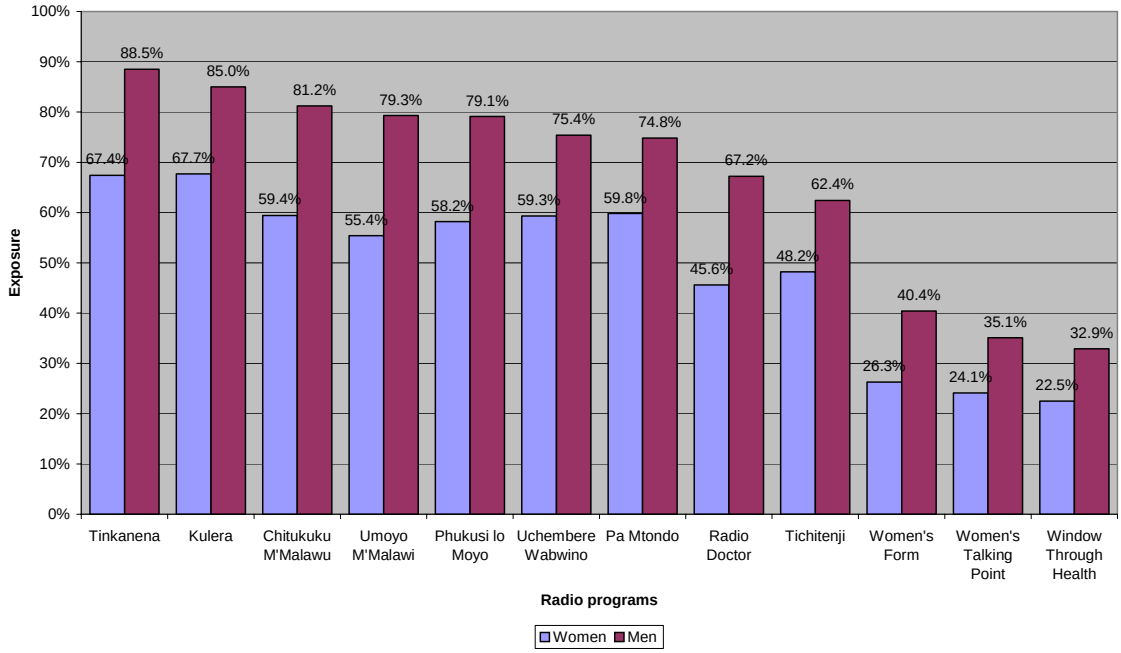

Table 1: Descriptive statistics, by gender

	Women	Men	*p*(diff)
N			
Age			
Mean	28.7	31.3	0.000
15-19	14.2%	13.4%	0.000
20-24	25.1%	19.3%	
25-29	20.5%	21.6%	
30-39	25.2%	27.5%	
40+	15.0%	18.2%	
Education			
No education	28.0%	10.7%	0.000
Primary	61.5%	67.4%	
secondary or higher	10.5%	21.9%	
Religion			
Catholic	21.9%	23.4%	0.000
Protestant	61.5%	59.1%	
Muslim	15.2%	14.4%	
Other	1.4%	3.1%	
Residence			
Urban	21.0%	22.2%	0.203
Rural	79.0%	77.8%	
Assets			
Mean	1.7		
Low	22.3%		
Medium	25.1%		
Medium-High	29.4%		
High	23.3%		
Reads newspapers			
No	69.9%	40.5%	0.000
Yes	30.1%	59.5%	
Listens to radio			
No	22.2%	7.2%	0.000
Yes	77.8%	92.8%	
Watches TV			
No	88.8%	63.8%	0.000
Yes	11.2%	36.2%	
Number of partners P12M			
None	0.0%		0.000
One	98.8%	82.1%	
two or more	1.2%	17.9%	
Consistent condom use reduces risk of HIV/AIDS			
No	34.7%	27.4%	0.000
Yes	65.3%	72.6%	

Table 1 (Continued)

	Women	Men	P
Heard any reproductive health messages on the radio			
No	23.6%	6.6%	0.000
Yes	76.4%	93.4%	
Number of radio programs exposed to			
Mean	6.1	8.3	0.000
Visited health facility in last 12 months			
No	38.5%		
Yes	61.5%		
Desires child within 2 years			
No	84.1%	86.8%	0.001
Yes	15.9%	13.2%	
Knows where to obtain a condom			
No	21.2%	10.9%	0.000
Yes	78.8%	89.1%	
Last partner casual			
No	99.4%	94.2%	0.000
Yes	0.6%	5.8%	
Could get condom			
No	39.6%	18.2%	0.000
Yes	60.4%	81.8%	
Discusses FP with partner in past few months			
No	88.9%	80.9%	0.000
Yes	11.1%	19.1%	
Used a condom at last sex			
No	95.0%	85.4%	0.000
Yes	5.0%	14.6%	
Ever condom use			
No	89.6%	58.0%	0.000
Yes	10.4%	42.0%	

Table 2: Poisson regression results for the number of family planning and health radio programs one had been exposed to

	Number of Radio Programs Exposed To	
	Women	Men
Age	0.003***	0.004***
	(0.000)	(0.001)
Residence: Rural	0.031**	0.022
	(0.011)	(0.018)
Education: None (reference)		
Education: Primary	0.121***	0.055*
	(0.011)	(0.027)
Education: Secondary or higher	0.235***	0.120***
	(0.017)	(0.032)
Number of partners past 12 months	0.064	-0.018
	(0.036)	(0.018)
Consistent condom use reduces risk of HIV/AIDS	0.122***	0.079***
	(0.009)	(0.016)
Reads newspaper	0.109***	0.126***
	(0.010)	(0.017)
Watches TV	0.014	0.091***
	(0.013)	(0.016)
Listens to radio	1.093***	0.516***
	(0.016)	(0.036)
Assets	0.085***	
	(0.003)	
Visited health center	0.117***	
	(0.008)	
Constant	0.199***	1.238***
	(0.049)	(0.065)
Pseudo-R2	17.0%***	4.1%***
N	10465	2486

Table 3: Logistic regression results for discussing family planning with one's partner in the past few months

	Females		Males	
OR (95% CI)	(1)	(2)	(3)	(4)
Number of radio programs exposed to				
Observed	1.052***		1.059**	
	(1.034 - 1.070)		(1.023 - 1.095)	
Predicted		1.071**		0.996
		(1.028 - 1.117)		(0.904 - 1.097)
Age	1.004	1.004	1.028***	1.030***
	(0.997 - 1.012)	(0.996 - 1.012)	(1.018 - 1.038)	(1.019 - 1.041)
Religion: Protestant (reference)				
Religion: Catholic	1.047	1.048	1.021	1.020
	(0.902 - 1.217)	(0.902 - 1.218)	(0.799 - 1.304)	(0.798 - 1.303)
Religion: Muslim	0.884	0.901	0.683*	0.689*
	(0.729 - 1.073)	(0.743 - 1.092)	(0.489 - 0.953)	(0.493 - 0.961)
Religion: Other	1.312	1.297	1.402	1.306
	(0.766 - 2.247)	(0.758 - 2.219)	(0.805 - 2.445)	(0.752 - 2.267)
Residence: Rural	1.477***	1.470***	1.209	1.199
	(1.234 - 1.769)	(1.227 - 1.761)	(0.927 - 1.575)	(0.919 - 1.565)
Assets	1.072*	1.047		
	(1.014 - 1.133)	(0.978 - 1.120)	-.-	-.-
Education: None (reference)				
Education: Primary	1.096	1.068	0.892	0.940
	(0.935 - 1.286)	(0.905 - 1.261)	(0.630 - 1.264)	(0.654 - 1.353)
Education: Secondary	0.898	0.841	1.015	1.133
	(0.694 - 1.162)	(0.637 - 1.111)	(0.672 - 1.533)	(0.713 - 1.801)
Number of partners in past 12 months	0.501	0.496	0.879	0.880
	(0.231 - 1.086)	(0.229 - 1.075)	(0.669 - 1.156)	(0.669 - 1.156)
Consistent condom use reduces risk of HIV/AIDS	1.049	1.013	0.954	0.983
	(0.914 - 1.203)	(0.878 - 1.168)	(0.755 - 1.205)	(0.773 - 1.250)
Desires child within next 2 years	0.613***	0.613***	1.074	1.056
	(0.499 - 0.753)	(0.499 - 0.753)	(0.794 - 1.453)	(0.781 - 1.428)
Knows sources of condoms	1.489**	1.526**	0.818	0.875
	(1.165 - 1.903)	(1.195 - 1.950)	(0.445 - 1.503)	(0.477 - 1.605)
Could obtain condom	1.434***	1.489***	2.403**	2.520***
	(1.206 - 1.705)	(1.253 - 1.768)	(1.462 - 3.950)	(1.536 - 4.136)
Visited health center	1.879***	1.828***		
	(1.623 - 2.175)	(1.573 - 2.124)	-.-	-.-
Constant	0.025***	0.025***	0.032***	0.043***
	(0.010 - 0.063)	(0.010 - 0.063)	(0.013 - 0.078)	(0.015 - 0.119)
Pseudo-R2	4.6%***	4.3%***	3.3%***	2.8%***

significance: *: 0.050; **: 0.010; ***: 0.001

Table 4: Logistic regression results for ever condom use

	Females		Males	
OR (95% CI)	(1)	(2)	(3)	(4)
Number of radio programs exposed to				
Observed	1.017		1.062***	
	(0.999 - 1.035)		(1.032 - 1.092)	
Predicted		1.053*		1.122**
		(1.008 - 1.101)		(1.029 - 1.223)
Age	0.963***	0.963***	0.961***	0.960***
	(0.954 - 0.972)	(0.954 - 0.971)	(0.952 - 0.969)	(0.951 - 0.969)
Religion: Protestant (reference)				
Religion: Catholic	1.014	1.013	1.080	1.064
	(0.868 - 1.186)	(0.866 - 1.184)	(0.873 - 1.335)	(0.861 - 1.315)
Religion: Muslim	0.769*	0.774*	1.227	1.209
	(0.620 - 0.953)	(0.624 - 0.959)	(0.946 - 1.593)	(0.931 - 1.569)
Religion: Other	1.095	1.096	0.384**	0.366**
	(0.582 - 2.059)	(0.582 - 2.063)	(0.194 - 0.759)	(0.185 - 0.722)
Residence: Rural	0.789**	0.782**	0.891	0.912
	(0.668 - 0.932)	(0.662 - 0.924)	(0.717 - 1.108)	(0.733 - 1.135)
Assets	1.061*	1.020		
	(1.004 - 1.120)	(0.952 - 1.092)	-.-	-.-
Education: None (reference)				
Education: Primary	1.718***	1.648***	1.080	0.996
	(1.399 - 2.109)	(1.334 - 2.034)	(0.780 - 1.497)	(0.709 - 1.399)
Education: Secondary	2.986***	2.723***	2.651***	2.259***
	(2.301 - 3.874)	(2.055 - 3.609)	(1.823 - 3.855)	(1.486 - 3.434)
Number of partners in past 12 months	3.237***	3.172***	1.656***	1.650***
	(2.135 - 4.908)	(2.089 - 4.817)	(1.322 - 2.074)	(1.318 - 2.065)
Consistent condom use reduces risk of HIV/AIDS	1.235**	1.182*	0.961	0.916
	(1.063 - 1.436)	(1.010 - 1.382)	(0.783 - 1.179)	(0.742 - 1.131)
Desires child within next 2 years	0.925	0.921	0.812	0.814
	(0.768 - 1.114)	(0.765 - 1.109)	(0.625 - 1.055)	(0.627 - 1.058)
Knows sources of condoms	2.713***	2.713***	1.478	1.542
	(1.920 - 3.835)	(1.919 - 3.834)	(0.837 - 2.609)	(0.874 - 2.720)
Could obtain condom	1.855***	1.878***	3.399***	3.498***
	(1.532 - 2.245)	(1.552 - 2.272)	(2.267 - 5.097)	(2.335 - 5.239)
Visited health center	1.057	1.021		
	(0.917 - 1.219)	(0.881 - 1.183)	-.-	-.-
Constant	0.016***	0.016***	0.195***	0.132***
	(0.008 – 0.032)	(0.008 - 0.032)	(0.088 - 0.431)	(0.053 - 0.333)
Pseudo-R2	10.3%***	10.3%***	13.4%***	13.1%***

significance: *: 0.050; **: 0.010; ***: 0.001

Table 5: Logistic regression results for condom use at last intercourse

	Females		Males	
OR (95% CI)	(1)	(2)	(3)	(4)
Number of radio programs exposed to				
Observed	0.998 (0.974 - 1.023)		1.031 (0.990 - 1.073)	
Predicted		1.036 (0.973 - 1.102)		1.158* (1.014 - 1.322)
Age	0.907*** (0.893 - 0.922)	0.907*** (0.892 - 0.921)	0.913*** (0.898 - 0.928)	0.910*** (0.896 - 0.925)
Religion: Protestant (reference)				
Religion: Catholic	1.087 (0.876 - 1.349)	1.085 (0.874 - 1.346)	0.994 (0.749 - 1.319)	0.986 (0.743 - 1.309)
Religion: Muslim	0.867 (0.645 - 1.165)	0.867 (0.645 - 1.165)	0.995 (0.688 - 1.439)	0.978 (0.676 - 1.416)
Religion: Other	0.785 (0.275 - 2.243)	0.789 (0.276 - 2.256)	0.489 (0.146 - 1.635)	0.502 (0.150 - 1.677)
Residence: Rural	0.854 (0.678 - 1.076)	0.848 (0.673 - 1.068)	0.797 (0.603 - 1.054)	0.821 (0.620 - 1.088)
Assets	1.044 (0.969 - 1.124)	1.006 (0.916 - 1.106)	-.-	-.-
Education: None (reference)				
Education: Primary	1.311 (0.964 - 1.784)	1.256 (0.916 - 1.721)	1.137 (0.638 - 2.026)	0.983 (0.540 - 1.787)
Education: Secondary	4.009*** (2.793 - 5.752)	3.637*** (2.464 - 5.368)	2.173* (1.185 - 3.985)	1.640 (0.836 - 3.215)
Number of partners in past 12 months	2.824*** (1.666 - 4.787)	2.771*** (1.632 - 4.705)	0.897 (0.656 - 1.226)	0.903 (0.660 - 1.235)
Consistent condom use reduces risk of HIV/AIDS	1.225 (0.989 - 1.516)	1.179 (0.943 - 1.474)	1.044 (0.782 - 1.395)	0.957 (0.707 - 1.296)
Desires child within next 2 years	0.541*** (0.400 - 0.731)	0.540*** (0.400 - 0.730)	0.241*** (0.136 - 0.429)	0.243*** (0.137 - 0.433)
Knows sources of condoms	2.044** (1.261 - 3.314)	2.023** (1.248 - 3.280)	1.721 (0.540 - 5.486)	1.738 (0.545 - 5.543)
Could obtain condom	2.068*** (1.543 - 2.773)	2.059*** (1.537 - 2.757)	3.675** (1.752 - 7.707)	3.667** (1.749 - 7.686)
Visited health center	0.715** (0.590 - 0.867)	0.692*** (0.567 - 0.845)	-.-	-.-
Constant	0.062*** (0.024 - 0.163)	0.061*** (0.023 - 0.160)	0.432 (0.114 - 1.643)	0.211* (0.046 - 0.974)
Pseudo-R2	15.1%***	15.1%***	16.3%***	16.5%***

significance: *: 0.050; **: 0.010; ***: 0.001